

TEST REPORT

Product Name : 70mai Smart Dash Cam Pro
Model Number : Midrive D02

Prepared for : 70mai Co.,Ltd.
Address : Room 2220,building 2,No.588,Zixing road,MinHang District,
Shanghai.CHINA

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Report Number : ES191224019W02
Date(s) of Tests : December 25, 2019 to December 30, 2019
Date of issue : December 31, 2019

TEST RESULT CERTIFICATION

Applicant : 70mai Co.,Ltd.

Address : Room 2220,building 2,No.588,Zixing road,MinHang District,Shanghai.CHINA

Manufacture : 70mai Co.,Ltd.

Address : Room 2220,building 2,No.588,Zixing road,MinHang District,Shanghai.CHINA

EUT : 70mai Smart Dash Cam Pro

Model : Midrive D02

Trademark : N/A

Measurement Procedure Used:


APPLICABLE STANDARDS		
STANDARD	Test Procedure	TEST RESULT
RCR STD-33 Ver.5.4	MIC public notice 88:2004, annex 44 MIC public notice 88:2004, annex 1	PASS

The device described above is tested by EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (SHENZHEN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) was measured according to the test methods of Ordinance Concerning Technical Regulations Conformity Certification etc. of Specified Radio Equipment in Annex 1, the Ministry of Internal Affairs and Communication notification in Annex "43" of Article 88, Paragraph 1 or the test method more than equivalent and the result is technically compliant with the ARIB STD T-66 requirements.


The test results of this report relate only to the tested sample identified in this report

Date of Test : December 25, 2019 to December 30, 2019


Prepared by :


Sewen Guo /Editor

Reviewer :


Sevin /Supervisor

Approve & Authorized Signer :


Lisa Wang/Manager



Modified Information

Rev.	Summary	Date of Rev.	Report No.
Ver.1.0	Original Report	December 31, 2019	ES191224019W02

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1 EUT TECHNICAL DESCRIPTION

1.1 PRODUCT DESCRIPTION

Characteristics	Description
Device Type:	Wifi 2.4G with channel 14
IEEE 802.11 WLAN Mode Supported:	802.11b
Data Rate :	1,2,5.5,11Mbps;
Modulation:	DSSS with DBPSK/DQPSK/CCK ;
Operating Frequency Range:	2484MHz
Number of Channels:	1 Channel
Rated Antenna power:	1.0 mW/MHz
Antenna Type:	Internal antenna
Antenna Gain:	1.0 dBi
Power supply:	<input checked="" type="checkbox"/> DC 5A,2.0A
Car charger:	Model: Midrive CC01 Input: DC12V-24V Output:DC5V,2.4A/1.0A(Max 3.4A)
Battery:	500mAh,3.7V
Hardware version:	LGDM005D
Software version:	1.0.7Hna
Temperature Range:	-10°C ~ +60°C

Note: for more details, please refer to the User's manual of the EUT.

2 SUMMARY OF TEST RESULT

TELEC RULES	Test Parameter	Verdict	Remark
Item 19	RF Output Power	PASS	
Item 19	Frequency Tolerance	PASS	
Item 19	Occupied Bandwidth /Spreading Bandwidth/Spread Factor	PASS	
Item 19	Transmitter Spurious Emissions	PASS	
Item 19	Receiver Spurious Emissions	PASS	
Item 19	Interference Prevention Function	PASS	
NOTE1: N/A (Not Applicable)			

3 TEST METHODOLOGY

3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
Item 19 of Article 2 Paragraph 1 of the TELEC rules for 2.4GHz band wide-band low-power data communication system. All measurements contained in this report were conducted with test method for radio equipment specified in MIC public notice 88:2004, annex 43 for certification. And measuring method for electric field intensity of radio station with remarkably weak radiowave transmitted.

3.2 MEASUREMENT EQUIPMENT USED

3.2.1 Conducted Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/16/2019	05/15/2020
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/16/2019	05/15/2020
50Ω Coaxial Switch	Anritsu	MP59B	M20531	05/16/2019	05/15/2020
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/16/2019	05/15/2020
Voltage Probe	Rohde & Schwarz	TK9416	N/A	05/16/2019	05/15/2020
I.S.N	Rohde & Schwarz	ENY22	1109.9508.02	05/16/2019	05/15/2020

3.2.2 Radiated Emission Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2019	05/15/2020
Pre-Amplifier	HP	8447D	2944A07999	05/16/2019	05/15/2020
Bilog Antenna	Schwarzbeck	VULB9163	142	05/16/2019	05/15/2020
Loop Antenna	ARA	PLA-1030/B	1029	05/16/2019	05/15/2020
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/16/2019	05/15/2020
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/16/2019	05/15/2020
Cable	Schwarzbeck	AK9513	ACRX1	05/16/2019	05/15/2020
Cable	Rosenberger	N/A	FP2RX2	05/16/2019	05/15/2020
Cable	Schwarzbeck	AK9513	CRPX1	05/16/2019	05/15/2020
Cable	Schwarzbeck	AK9513	CRRX2	05/16/2019	05/15/2020

3.2.3 Radio Frequency Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
Spectrum Analyzer	Agilent	E4407B	88156318	05/16/2019	05/15/2020
Signal Analyzer	Agilent	N9010A	My53470879	05/16/2019	05/15/2020
Power meter	Anritsu	ML2495A	0824006	05/16/2019	05/15/2020
Power sensor	Anritsu	MA2411B	0738172	05/16/2019	05/15/2020
Spectrum Analyzer	Rohde & Schwarz	FSV40	100967	05/16/2019	05/15/2020
Oscilloscope	Tektronix	TDS3012B	071-0964-03	05/21/2019	05/20/2020
Temperature & Humidity Chamber	YINHE	SDH0525F	2003003	05/21/2019	05/20/2020

Remark: Each piece of equipment is scheduled for calibration once a year.

3.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (☒802.11b:1 Mbps;) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

☒Frequency and Channel list for 802.11b:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
14	2484				

☒Test Frequency and Channel for 802.11b:

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
14	2484				

4 FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22."

4.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab.

: Accredited by CNAS, 2018.11.30

The certificate is valid until 2022.10.28

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)

The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2018.03.30

The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, August 09, 2018

Designation Number: CN1204

Test Firm Registration Number: 882943

Accredited by A2LA, August 08, 2018

The Certificate Registration Number is 4321.01

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0008

Name of Firm

: EMTEK(SHENZHEN) CO., LTD.

Site Location

: Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

5 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

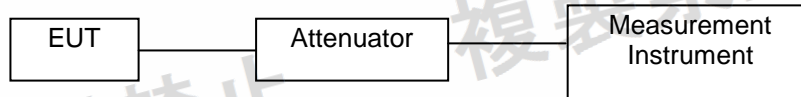
Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Uncertainty for Output power test	$\pm 0.83\text{dB}$
Conducted Emissions Test	$\pm 2.0\text{dB}$
Radiated Emission Test	$\pm 2.0\text{dB}$
Occupied Bandwidth Test	$\pm 1.0\text{dB}$
Power density test	$\pm 1.85\text{dB}$
All emission, radiated	$\pm 3\text{dB}$
Antenna Port Emission	$\pm 3\text{dB}$
Temperature	$\pm 0.5^\circ\text{C}$
Humidity	$\pm 3\%$

Measurement Uncertainty for a level of Confidence of 95%

6 SETUP OF EQUIPMENT UNDER TEST

6.1 RADIO FREQUENCY TEST SETUP 1

The WIFI component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.

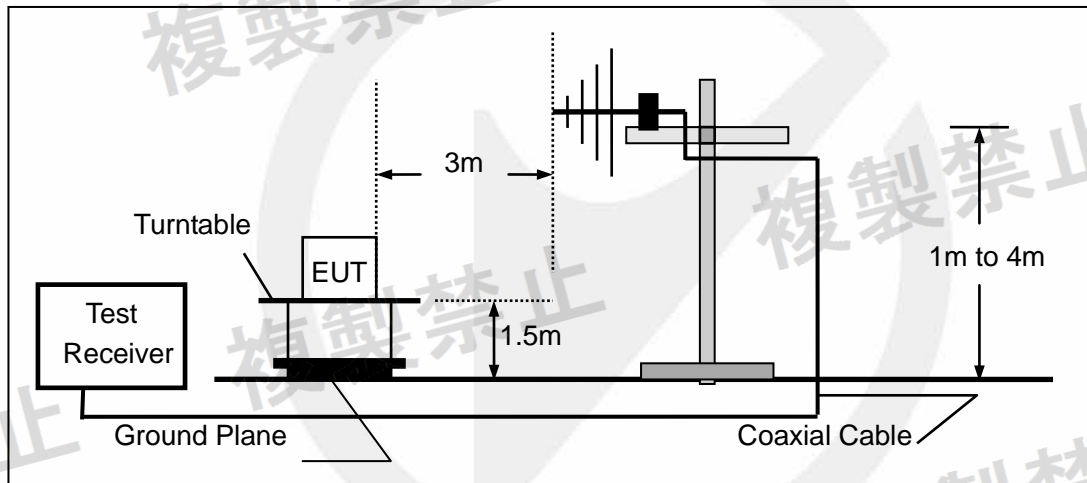


6.2 RADIO FREQUENCY TEST SETUP 2

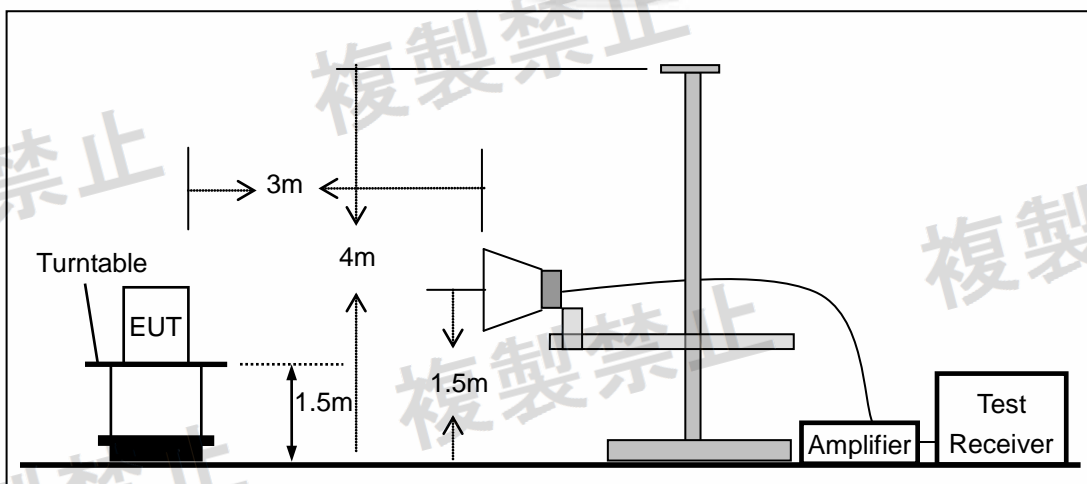
The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.4. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009 and CAN/CSA-CEI/IEC CISPR 22.

The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

(a) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(b) Radiated Emission Test Set-Up, Frequency above 1000MHz

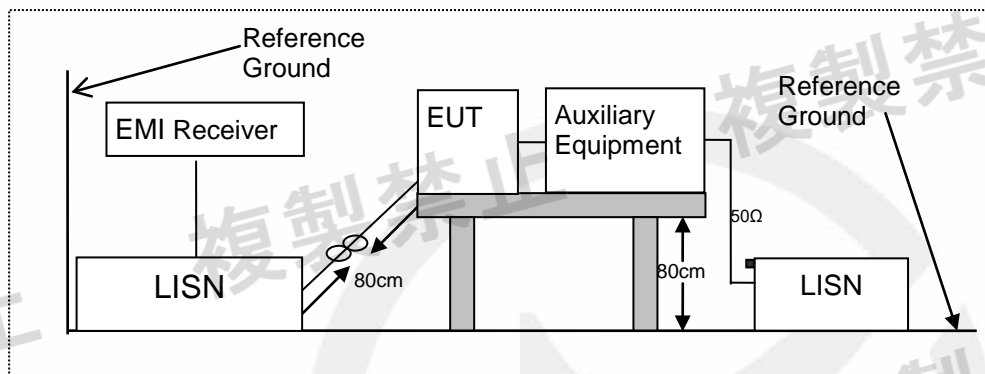


6.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1 m.

According to the requirements in Section 13.1.4.1 of ANSI C63.4-2009 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



6.4 SUPPORT EQUIPMENT

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
1.					

Notes:

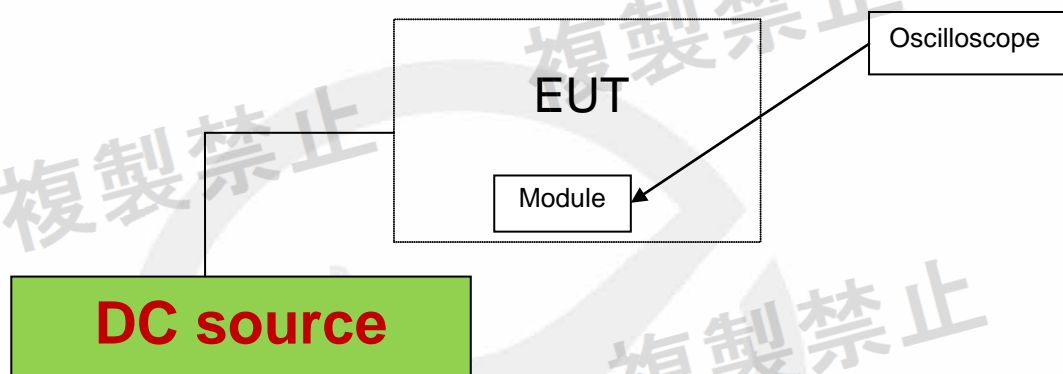
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. Unless otherwise denoted as EUT in [Remark] column, device(s) used in tested system is a support equipment

7 WIRELESS MODULE VOLTAGE TEST IN EXTREME CONDITIONS

7.1 Applicable Standard

When there is a fluctuation of $\pm 10\%$ input voltage from external power to the test equipment. If the fluctuation of input voltage to the circuit of the radio part (excl. power) in the test equipment is confirmed below $\pm 1\%$, Measurement shall be tested with the rated voltage.

7.2 Test Configuration



7.3 Test Results

Test Voltage	DC 5V	DC 4.5V	DC 5.5V
Module Test voltage	3.30	3.30	3.30
Module Rated voltage	3.30	3.30	3.30
The Range of Module Voltage(%)	0	0	0

Test Voltage	DC 5V	DC 4.5V	DC 5.5V
Module Test voltage	3.31	3.30	3.30
Module Rated voltage	3.30	3.30	3.30
The Range of Module Voltage(%)	0.3	0	0

Note: In extreme conditions, EUT module power is confirmed below $\pm 1\%$.

8 TEST REQUIREMENTS

8.1 FREQUENCY ERROR

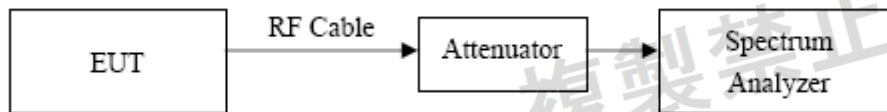
8.1.1 Applicable Standard

According to Item 19 of Article 2 Paragraph 1.

8.1.2 Conformance Limit

the maximum permit tolerance of frequency is 50ppm.

8.1.3 Test Setup Block Diagram



8.1.4 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=10KHz, Span = 1MHz.
- 4 'Maximum Hold' mode may be used to accumulate the measurement result over several scans provided emission is repetitive in nature.
5. Repeat above procedures until all frequency measured was complete.

8.1.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

8.1.6 Test Results

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading (MHz)	Deviation (kHz)	Tolerance (ppm)	Limit (ppm)	Verdict
Non-Modulation	14	2484	2483.97	-30	-12.08	50	PASS
Note: N/A (Not Applicable)							

8.2 OCCUPIED BANDWIDTH

8.2.1 Applicable Standard

According to Item 19 of Article 2 Paragraph 1.

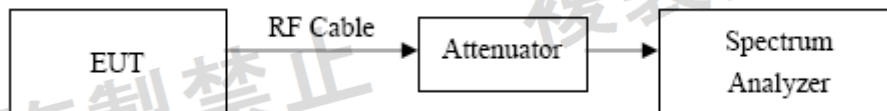
□

8.2.2 Conformance Limit

Occupied bandwidth: FH \leq 83.5 MHz; DS \leq 26 MHz; OFDM \leq 38 MHz, Others \leq 26 MHz

□ Spread Bandwidth: \geq 500 kHz (FH, DS), Spread factor $>$ 5.

8.2.3 Test Setup Block Diagram



8.2.4 Test Procedure

(1) Spectrum analyzer is set as below

Central Frequency	Test frequency
Sweeping Bandwidth	2 to 3.5 times the allowable value (SPAN=80MHz for 802.11n(HT40), SPAN=50MHz for the others)
Resolution Bandwidth	Lower than 3 % of allowable value (RBW=300kHz)
Video Bandwidth	Equivalent to resolvable bandwidth
Y-Axis Scale	10 dB/Div
Input Level	Carrier level is sufficiently higher than spectrum analyzer noise
Sweep Time	Minimum time to assure the measurement accuracy (In case of burst wave, 1 burst per 1 sample)
Sampling points	More than 400 points
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Positive peak
Trigger Condition	Max-hold

(2) Repeat the sweeping till no change was observed on the display and enter all values of data point to the computer as array variable.

(3) About all data, convert dB value to antilogarithm of electric power dimension.

(4) Add up the electric power of all data and record it as "Sum total of electric power".

(5) Adding up data in order from the lowest frequency to upper frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of "Sum total of electric power". Convert the limit point to frequency and record as "Lowest limit frequency".

(6) Adding up data in order from the highest frequency to lower frequencies, look for a limit point where the value reaches to 0.5% (5% in case of diffusion bandwidth) of "Sum total of electric power". Convert the limit point to frequency and record as "Highest limit frequency".

(7) Repeat above procedures until all frequency measured was complete.

(8) Spread Factor=Spread Bandwidth/modulation rate. The modulation rate: MR=1.375 for 802.11b, MR=1.5 for 802.11g/n20, MR=3 for 802.11n40.

8.2.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

8.2.6 Test Results

Occupied Bandwidth (99% Emission bandwidth)

Modulation Mode	Channel Number	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)	Verdict
802.11b	14	2484	19.855	≤26	PASS
Note: N/A (Not Applicable)					

Occupied Bandwidth (90% Emission bandwidth)

Modulation Mode	Channel Number	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	Limit (KHz)	Verdict
802.11b	14	2484	14.529	≥500	PASS
Note: N/A (Not Applicable)					

Test mode	Tx Frequency (MHz)	Spread Bandwidth	Rate (MHz)	Spread Factor	Limit
802.11b	2484	14.529	1.375	10.567	>5

99% Occupied Bandwidth

Test Model

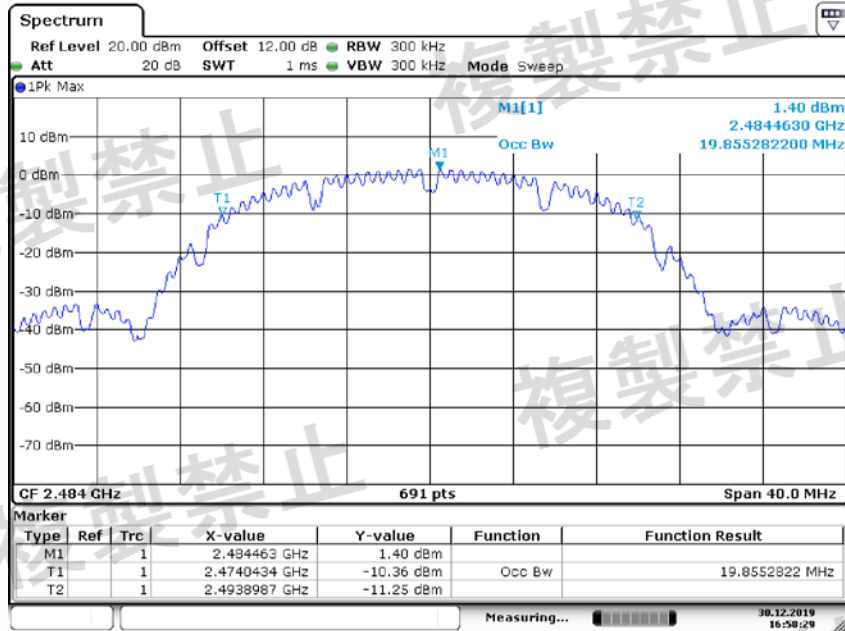
Occupied Bandwidth
802.11b

Test voltage

Normal voltage

Channel Frequency

2484MHz



Date: 30 DEC 2019 16:58:28

90% Occupied Bandwidth

Test Model

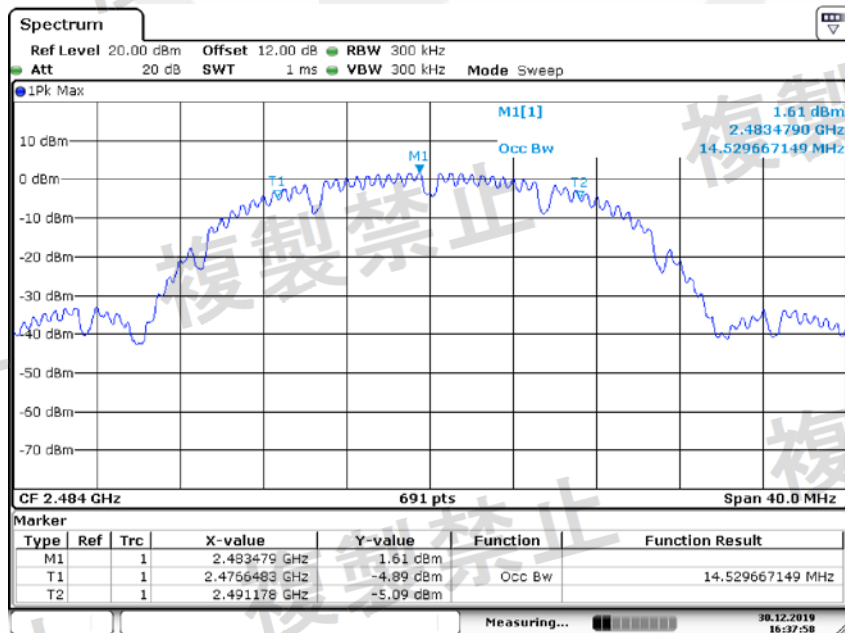
Occupied Bandwidth
802.11b

Test voltage

Normal voltage

Channel Frequency

2484MHz



Date: 30 DEC 2019 16:37:58

8.3 POWER TO ANTENNA (CONDUCTED)

8.3.1 Applicable Standard

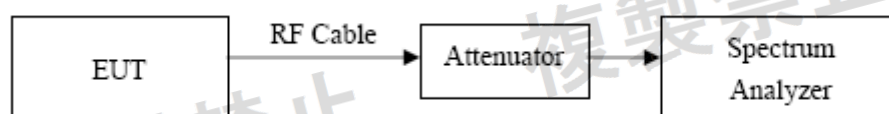
According to Equipment Regulations, art. 49.20,

8.3.2 Conformance Limit

The max permitted antenna power density shall not exceed 10mW/MHz and deviation of power density shall be within a range of -80% to +20% of declared power density.

Eirp: not exceed 12.14dBm/ MHz(OFDM.DS form 2400-2483.5 MHz)

8.3.3 Test Setup Block Diagram



8.3.4 Test Procedure

Set the EUT on the test frequency and the consecutive TX mode or continuous (constant period, constant burst length) burst TX mode.

In case of spreading code used, set on the test spreading code, then the modulation is performed with standard coding test signal.

(1) Measure the equivalent noise bandwidth at the spectrum analyzer for resolution bandwidth of 1 MHz, then read the value correcting the resolution bandwidth on the 1 MHz equivalent bandwidth. In case of a spreading bandwidth lower than 1 MHz, however, perform the correction only for a higher value than "Spreading bandwidth (MHz) / Equivalent noise bandwidth (MHz)".

(2) The attenuation value of the attenuator shall be set to achieve the optimal operating input level at the spectrum analyzer.

(3) Spectrum analyzer for seeking the maximum antenna power is set as below.

Central Frequency	Test frequency
Sweeping Bandwidth	Approx. twice the Occupied Bandwidth
Resolution Bandwidth	1 MHz
Video Bandwidth	Approx. twice the resolution bandwidth (2MHz)
Y-Axis Scale	10 dB/Div
Sweep Time	Minimum time to assure the measurement accuracy (In case of burst wave, 1 burst per 1 sample)
Trigger Condition	Free run
Data points	More than 400 points
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Positive peak
Display mode	Max-hold

(4) Spectrum analyzer for measuring the antenna power is set as below. In this case, calibrate the indication of the RF Power Meter on the output of the EUT with the RF Power Meter connected to the IF output of the spectrum analyzer.

Central Frequency	Frequency to achieve the maximum power (sought frequency)
Sweeping Bandwidth	0 Hz
Resolution Bandwidth	1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Sample

Measurement Procedure

(1) No frequency hopping systems:

- Configure the settings of the spectrum analyzer to 2(3).
- After repeating sweeps (until no display changes are found), measure the maximum power frequency per MHz.
- Connect the high frequency power meter to the IF output of the spectrum analysers.
- Configure the settings of the spectrum analyzer to 2(4).
- Set the antenna power as follows:
 - Continuous waves: value indicated on the high frequency power meter, corrected according to 2(1).
 - Burst waves: value similarly corrected in the case of continuous waves and value calculated from the average power within bursts from rates of transmission times (i.e. correction on the duty-cycle, to find the average within the transmit burst)

8.3.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

8.3.6 Test Results

RF Output Power:

Test mode	Frequency (MHz)	Measure Value (dBm/MHz)	Limit (dBm/MHz)	Antenna Gain (dBi)	EIRP (dBm/MHz)	EIRP Limit (dBm/MHz)
802.11b	2484	-2.37	10	1.0	-1.37	12.14

All the EIRP is less than 12.14, the half-power beam width is not necessary

RF Output Power Tolerance

Test mode	Frequency (MHz)	Output Power (mW/MHz)	Rated Output Power (mW/MHz)	Tolerance (%)	Limit (%)
802.11b	2484	0.58	1.0	-42	+20% to -80%

Note: Tolerance = (Output Power – Rated Output Power) / Rated Output Power * 100%

8.4 SPURIOUS EMISSIONS INTENSITY

8.4.1 Applicable Standard

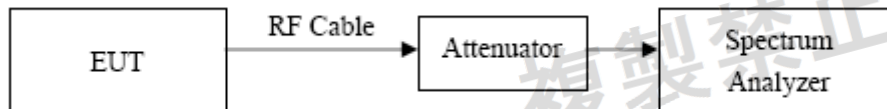
According to Item 19 of Article 2 Paragraph 1

8.4.2 Conformance Limit

Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency f other than frequency band used shall be as follows:

- | | |
|---|-----------------------------------|
| a. $2,458\text{MHz} \leq f \leq 2,471\text{MHz}$ and $2,497\text{MHz} < f \leq 2,510\text{MHz}$ | 25 μW (-16dB) or less |
| b. $2,458\text{MHz} > f$ and $2,510\text{MHz} < f$ | 2.5 μW (-26dB) or less |

8.4.3 Test Configuration



8.4.4 Test Procedure

(1) Spectrum analyzer for seeking the spurious emission is set as below

Sweeping Bandwidth	For seeking the spurious emission, from frequency lowest possible to the 5 times the carrier frequency
Resolution Bandwidth	1 MHz
Video Bandwidth	Approx. As same as Resolution bandwidth (1 MHz)
Y-Axis Scale	10 dB/Div
Input Level	Value of maximum dynamic range
Sweep Time	Minimum time to assure the measurement accuracy (Note 1)
Sweep Mode	Single sweep
Phase-Detection Mode	Positive peak

(2) The settings of the spectrum analyzer while conducting spurious amplitude measurements are as follows:

- Central Frequency: Acquired spurious frequencies in (1)
- Sweep Frequency 0 Hz
- Resolution Bandwidth 1 MHz
- Video Bandwidth same as Resolution Bandwidth
- Note: take into account that the requirement limits the power in a bandwidth of 1 MHz.
- If the measurement is carried out with a bandwidth of 100 kHz (for frequencies below 1 GHz), the limit shall be reduced with 10 dB.
- For example 2.5 μW in 1 MHz = -26 dBm limit, becomes -36 dBm for 100 kHz bandwidth.
- Y-Axis Scale 10 dB/Div
- Input Level: choose input level within the linear range of the SA mixer (so that no additional spurious are generated by the mixer)
- Sweep Time: Minimum amount of time to ensure measurement accuracy. However, in the case of burst waves, time exceeds duration of 1 burst.
- Data Points Over 400 points
- Sweep Mode: Single sweep

- Detection Mode Sample (BIN-Width \ll RBW, so that all spurious emissions are captured) [BIN-width is the frequency difference between 2 adjacent sample points on the display]

(3) Set EUT as occupied bandwidth is measure. That is, Set the EUT on the test frequency and the continuous TX mode or continuous (constant period, constant burst length) burst TX mode. In case of spreading code used, set on the test spreading code, then the modulation is performed with standard coding test signal.

The spectrum analyzer is set as 2 (1). Seek the spurious emission If the amplitude of the sought spurious emission satisfies the specified value (in case of 2 (2) Note 1, the specified value is -3dB), the measurement of 2 (2) is not performed, then the estimated value is employed as the measured value.

In case the sought spurious emission amplitude exceeds the specified value, seek the spurious frequency by narrowing the sweeping band sequentially as 100 MHz, 10 MHz, 1 MHz for the purpose of higher accuracy of

the spectrum analyzer. Set the spectrum analyzer as 2 (2). Estimate the mean value of the spurious amplitude, then employ it as the measured value (In case DSSS as well as OFDM with burst wave, the mean inside of the burst).

8.4.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

8.4.6 Test Results

■ Spurious Emission below 1GHz (30MHz to 2.387GHz)

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading frequency (MHz)	Reading (dBm)	Limit (dBm)	Verdict
802.11b	14	2484	2383.47	-50.96	-36	PASS

■ Spurious Emission in Restricted Band 2387-2400MHz

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading frequency (MHz)	Reading (dBm)	Limit (dBm)	Verdict
802.11b	14	2484	2399.28	-32.61	-16	PASS

■ Spurious Emission in Restricted Band 2483.5-2496.5MHz

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading frequency (MHz)	Reading (dBm)	Limit (dBm)	Verdict
802.11b	14	2484	2493.51	-47.61	-16	PASS

■ Spurious Emission between 2496.5MHz and 12.5GHz

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading frequency (MHz)	Reading (dBm)	Limit (dBm)	Verdict
802.11b	14	2484	4823.75	-29.67	-26	PASS

Test Model

Spurious Emission Intensity (30MHz to 12.5GHz)

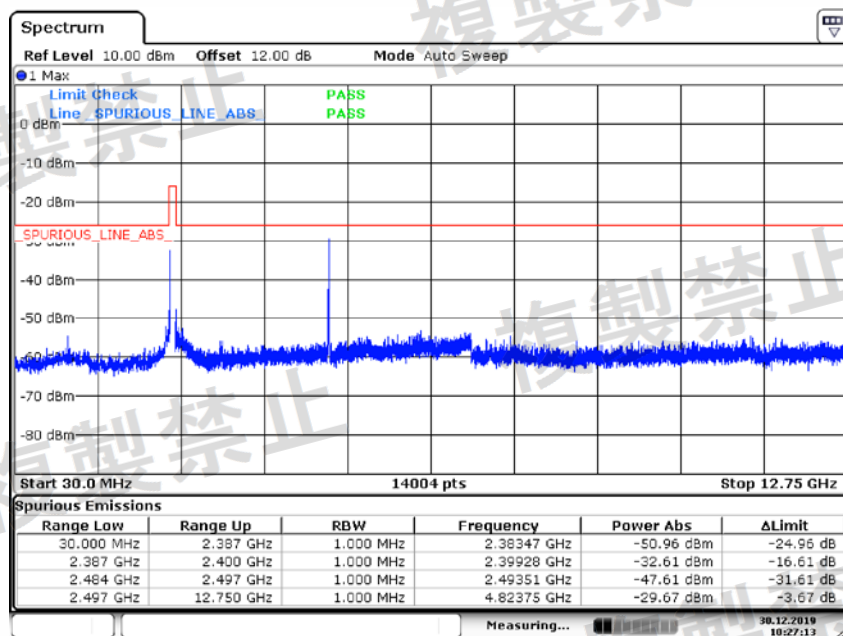
802.11b

Test condition

Normal voltage

Channel Frequency

2484MHz



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8.5 COLLATERAL EMISSIONS OF RECEIVER

8.5.1 Applicable Standard

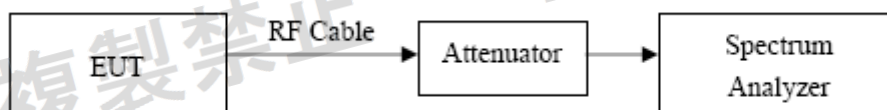
According to Item 19 of Article 2 Paragraph 1

8.5.2 Conformance Limit

The limit on secondary emissions radiated from the receiving equipment within which the function of other radio equipment will not be impaired shall be, in terms of the power of a dummy antenna circuit that has the same electrical constant as the receiving antenna, 4nW (-54dBm) or less at a frequency below 1 GHz and 20 nW(-47dBm) or less at a frequency of 1 GHz or higher as measured using the circuit.

- | | |
|----------------------|-----------------------|
| a. 30 MHz - 1000 MHz | 4 nW (-54dBm) or less |
| b. 1GHz – 12.5 GHz | 20 nW(-47dBm) or less |

8.5.3 Test Configuration



8.5.4 Test Procedure

Set the EUT so that the test frequency is can be measured receipt consecutively all the time.

(1) Set the attenuation value of the dummy load lowest as possible, due to low level of the measured object.

(2) Set Spectrum analyzer for seeking the collateral emission is set as below.

Sweeping Bandwidth	30MHz to 5 times of carrier frequency
Resolution Bandwidth	In case of frequency lower than 1 GHz, 100 kHz In case of frequency higher than 1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Time	Minimum time to assure the measurement accuracy
Y-Axis Scale	10 dB/Div
Sweep Mode	Single sweep
Phase-Detection Mode	Positive peak

(3) Spectrum analyzer for measuring the collateral emission is set as below.

Central Frequency	Collateral emission frequency
Sweeping Bandwidth	0 Hz
Resolution Bandwidth	In case of frequency lower than 1 GHz, 100 kHz In case of frequency higher than 1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Mode	Single sweep
Detection Mode	Sample

Set the spectrum analyzer as (2), seek the maximum amplitude of the collateral emission.

In case of sought result lower than 1/10 limit value, employ the sought value as the measured value.

In case the sought value exceeds 1/10 limit value, seek the collateral emission frequency by narrowing the sweeping band sequentially to 1/10 for the purpose of higher accuracy of the spectrum analyzer. Set the spectrum analyzer as (3).

8.5.5 Environmental Conditions

Temperature:	24 °C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

8.5.6 Test Results

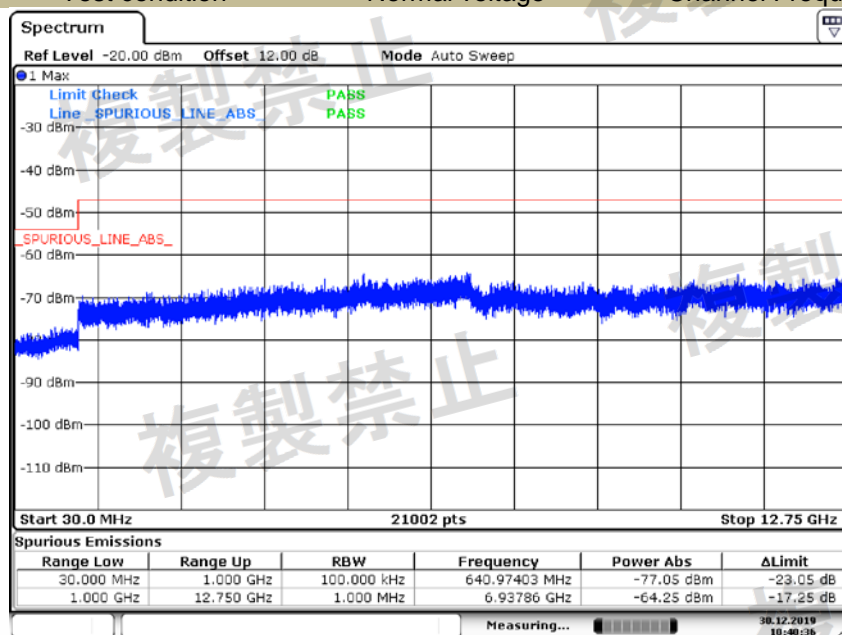
Collateral Emissions of Receiver below 1GHz (30MHz to 1GHz)

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading frequency (MHz)	Reading (dBm)	Limit (dBm)	Verdict
802.11b	14	2484	640.97	-77.05	-54	PASS

Collateral Emissions of Receiver above 1GHz (1GHz to 12.5GHz)

Modulation Mode	Channel Number	Channel Frequency (MHz)	Reading frequency (MHz)	Reading (dBm)	Limit (dBm)	Verdict
802.11b	14	2484	693.78	-64.25	-47	PASS

Test Model	Collateral Emissions of Receiver (30MHz to 12.5GHz)				
	802.11b				
Test condition	Normal voltage		Channel Frequency	2484MHz	



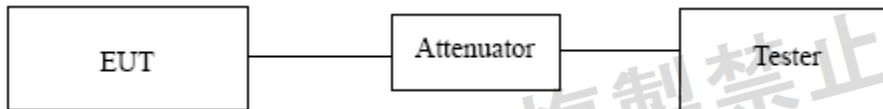
Date: 30 DEC. 2019 10:40:36

8.6 INTERFACE PREVENTION FUNCTION

8.6.1 Standard Applicable

According to Item 19 of Article 2 Paragraph 1. The device shall have the function of automatic transmission or reception of identification code.

8.6.2 Test Setup Block Diagram



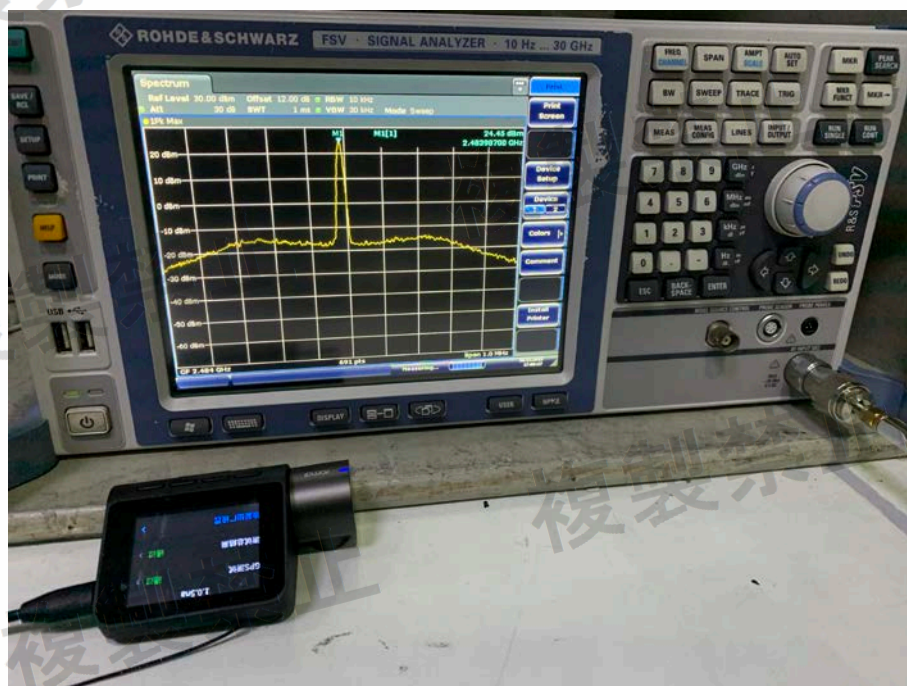
8.6.3 Test Procedure

1. Set the EUT in the usual operation condition
2. The radio equipment with automatic transmitting function of identification code
 - A. Transmit the assigned identification code from the radio equipment.
 - B. Confirm the identification code received by the demodulator.
3. The radio equipment with automatic receiving function of identification code
 - A. Transmit the assigned identification code from the opposite equipment.
 - B. Confirm that the usual communication is available.
 - C. Transmit the identification code distinct from the assigned one from the opposite equipment.
 - D. Confirm that the radio equipment is stopped or an indication is displayed as the identification code is different.
4. The identification function shall be recorded with "Good" or "No".

8.6.4 Summary of Test Results/Plots

Test Item	Test Result
Transmitting Function of Identification Code	The device have the function of automatic transmission or reception of identification code
Receiving Function of Identification Code	The device have the function of automatic transmission or reception of identification code

9 APPENDIX PHOTOGRAPHS OF TEST SETUP



*** End of Report ***